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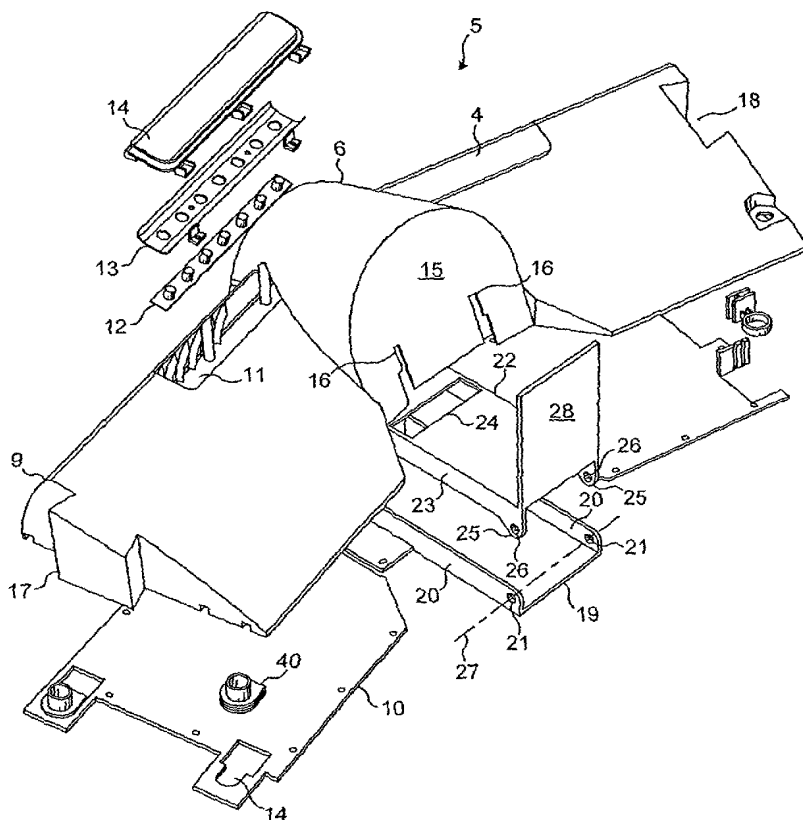
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[Continued on next page]

(54) Title: SOCCER TRAINING APPARATUS



(57) Abstract: A soccer training apparatus (1) is disclosed and includes a chassis (10) and a plurality of contact members (3) arranged, in an operable configuration, to partially surround a user. Each contact member (3) has a visual indicator (4) associated with it capable of being activated by a user in accordance with a random or preset sequence. Switch means (35, 36) is associated with each contact member (3) and is operable to deactivate a visual indicator (4) when a contact member (3) is kicked by the user and control means (50) detects when a visual indicator (4) has been deactivated and activates the next visual indicator (4) in the sequence. Each contact member (3) is attached to a rocker arm (22) pivotally mounted to the chassis (10) and the switch means comprises an actuator (35) on the rocker arm (22) and a sensor (36) on the chassis (10) such that, when a contact member (3) is kicked by a user, movement of the actuator (35) is detected by the sensor (36) to deactivate the visual indicator (4).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Soccer Training Apparatus

Description

The present invention relates to a soccer training apparatus. In particular, it relates
5 to a device for improving and assessing the skill and reactions of soccer players.

Many sports require the participant to perform a number of different movements quickly and in rapid succession. In soccer, for example, passing, tackling and winning of the ball requires a substantial degree of skill and quick thinking if the
10 participant is to successfully play the game. Usually, the proficiency of the participant in carrying out the type of movements which frequently occur when playing soccer depends upon their coordination, reflexes, balance, speed and fitness and it can take a considerable length of time, experience and intensive training to learn these skills and obtain the necessary levels of fitness before a sufficient level
15 of competence is reached.

The primary form of training involves actually playing soccer as often as possible as no other type of training is sufficiently realistic or directed specifically at developing the necessary skills. However, the opportunity to play on a regular basis does not
20 always arise and so other forms of general fitness training must be undertaken instead. Although this results in an improvement in the overall fitness of the player, it generally does not develop the essential skills that a soccer player must possess if they are to quickly improve their technique and abilities.

25 Furthermore, it is impossible for a soccer player to accurately monitor and assess their performance over a period of time and thereby enable them to pinpoint their strengths and weaknesses and give them an indication of areas in which improvement and further training might be required to fully develop their skills in all areas of the game.

30

It is an object of the present invention to overcome or substantially alleviate the problems mentioned above.

According to the present invention, there is provided a soccer training apparatus including a chassis and a plurality of contact members on the chassis arranged, in an operable configuration, to at least partially surround a user, each contact member having a visual indicator associated therewith capable of being activated by a user in accordance with a random or preset sequence, switch means associated with each contact member operable to deactivate said associated visual indicator when a contact member is kicked by the user and control means for detecting when a visual indicator has been deactivated and for activating the next visual indicator in the sequence, wherein each contact member is attached to a rocker arm pivotally mounted to the chassis and the switch means comprises an actuator on the rocker arm and a sensor on the housing such that, when a contact member is kicked by a user, movement of the actuator is detected by the sensor to deactivate the visual indicator.

In a preferred embodiment, the sensor comprises an optical sensor and the actuator comprises a blocking element, the arrangement being such that the blocking element moves to interrupt a beam of light generated by the sensor in response to a ball pad being kicked, said interruption being detected by the sensor.

Preferably, the rocker arm includes biasing means to bias it into a rest position in which the blocking element does not interrupt the light beam.

The biasing means may conveniently comprise a resiliently compressible member disposed between the rocker arm and the chassis.

Preferably, a stop is provided to limit rebound of the rocker arm after a ball pad has been kicked.

In one embodiment, the stop is a rod upstanding from the chassis through an aperture in the rocker arm and rocker arm restraint means mounted on the rod.

Advantageously, the rod is threaded and the rocker arm restraint means comprises a nut threadingly received on a portion of the rod that protrudes through the aperture in the rocker arm.

- 5 In a preferred embodiment, the rocker arm is normally biased against the nut by the compressible member.

Advantageously, a damping member is disposed between the nut and the rocker arm.

10

The contact member preferably has a foamed polyurethane core.

- The apparatus is advantageously formed from a plurality of releasably attachable modules, each module including at least one contact member. The modules co-
15 operate together to partially surround a user in an arcuate configuration.

In one embodiment, co-operating means is provided at each end of a module for attachment to an adjacent module.

- 20 The co-operating means preferably comprises a tenon on one module that dovetails with a mortise on an adjacent module.

In a preferred embodiment, the control means is a control unit releasably attachable to the free end of one module.

25

The control unit preferably comprises a computer processor, a memory for storing one or more computer programs and a use interface for selecting a program stored in the memory.

- 30 The present invention also provides a computer program for use with a soccer training apparatus comprising a chassis and a plurality of contact members on the chassis each having a visual indicator, the program being operable, when run on a computer processor, to activate the visual indicators in a random or preset

sequence, switch means associated with each contact member being operable to deactivate an associated visual indicator when a contact member is kicked by a user, the program also being operable to activate the next visual indicator in the sequence.

5

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

FIGURE 1 illustrates a front perspective view of the assembled device according to the invention;

10

FIGURE 2 illustrates a perspective view of a single module forming part of the assembled device shown in Figure 1;

Figure 3 illustrates an exploded perspective view of the single module shown in Figure 2;

15

Figure 4 illustrates a section through the module shown in Figure 2;

Figure 5 illustrates a perspective cut-away view of the module shown in Figure 2.

20

Referring now to the drawings, a reflex and reaction training system for soccer players 1 is shown and comprises a body 2 having five mutually spaced contact members in the form of ball pads 3 mounted thereon and a visual indicator in the form of a light 4 mounted within the body adjacent to each ball pad 3.

25

The body 2 comprises a plurality of discrete modules 5 (see Figure 2) which interlock so that the ball pads 3 are disposed in an arcuate configuration and so as to partially surround a user of the device who would generally stand in the region of the area marked X in Figure 1. Each module 5 has a central hub portion 6 with a pair of spacing arms 7,8 that protrude at an angle from either side of the central hub 6 so as to partially surround a single ball pad 3 disposed in front of the central hub 6.

30

A control module 50 is attached to the free end of one module 5 through which the user can control the operation of the apparatus and so that he may obtain an indication of his score via an LCD display. The control module 50 houses the

electronics and software required to control various different programs that light the ball pads 3 up in a predetermined or random sequence. It also receives a signal from each ball pad 3 when it has been kicked so that the next pad 3 in the sequence is illuminated. Power is supplied to the control unit 50 and each module via a mains supply or battery pack (not shown) and each module 5 is electrically connected to its adjacent module through electrical connectors (not shown) disposed in the end of the arms 7,8.

As can be seen from the exploded view of Figure 3, the module 5 is formed in two main parts comprising an upper housing portion 9 and a chassis 10 to which the upper housing portion 9 is attached. The upper housing portion 9 incorporates the central hub 6 and has elongate apertures 11 therein on its top edge adjacent to the central hub 6. The visual indicators 4 that locate in these apertures each comprise an array of LEDs 12 and an associated reflector 13. The LEDs 12 and reflector 13 are covered by a coloured lens 14 that clips into the aperture 11. The hub 6 has a flat front facing surface 15 in which is formed a pair of slots 16 for reasons which will become apparent. One end of the housing portion 9 has a tenon or projecting portion 17 that dovetails with a co-operating mortise or recess in an adjacent module 5 (not shown) to attach a series of modules together to form the arcuate configuration of Figure 1. One such recess or mortise 18 is formed at the opposite end of the module 5.

The chassis 10 is formed from a generally planar sheet. Mounting bosses 40 are received in apertures 41 as shown in Figure 3. Rods (not shown) may be inserted through these bosses 40 and into the ground beneath the surface on which the device is placed to hold it more securely in place. The chassis 10 also has an elongate mounting plate 19 attached to it in a region beneath the central hub 6. The plate 19 protrudes through the slots 16 in the facing surface 15 of the hub 6 and has upturned longitudinal edges 20. Axially aligned apertures 21 are provided in the upturned edges 20 adjacent one end of the plate 19 remote from the hub 6. An elongate L-shaped rocker arm 22 sits on the plate 19 and has downwardly depending lateral edges 23 which locate over the longitudinal edges 20 of the plate 19. As with the plate 19, the rocker arm 22 extends through the slots 16 in the front face 15 of

the central hub 6. The upper wall of the rocker arm 22 has an opening 24 therein to receive part of the front face 15 between the slots 16. A pair of tabs 25 each having holes 26 therein depend from the lateral edges 23 such that when the rocker arm 22 is placed on the plate 19, the apertures 21 and the holes 26 are all in axial alignment.

5 A pin (not shown) is inserted through these holes to mount the rocker arm 22 to the plate 19 and allow it to pivot about a pivot axis 27.

The rocker arm 22 has an upstanding front wall portion 28 to which is attached a ball pad 3 which is designed to resemble a football. The pad 3 has a leather or

10 plastic outer shell 29 with a foamed polyurethane inner core 30. A portion of the pad 3 is removed to enable its attachment to the front wall portion 28 of the rocker arm 22 so that it sits in front of the central hub 6 as most clearly shown in Figure 2.

The opposite end of the rocker arm 22 remote from the pivot axis 27 extends into

15 the hub 6 and its underside rests on a resilient compressible member or damping block 31. A rebound restraint rod 32 is mounted to the chassis 10 and upstands therefrom through an aperture in the upper wall of the rocker arm 22. A nut 33 and anti-knock rubber washer 34 is mounted to the end of the rod 32 over the rocker arm 22.

20 An actuator or blocking member 35 protrudes from the end of the rocker arm 22 inside the hub 6. An optical sensor 36 is also mounted on a sensor support post 37 which upstands from the chassis 10. The sensor 36 is positioned so that it interacts with the actuator 35 when the rocker arm 22 pivots about axis 27, as will now be

25 explained.

Operation and use of the training device will now be explained. When a user is to commence use of the device, they stand facing the array of ball pads 3 in the position marked X in Figure 1, having first selected a program via the control unit

30 50. When a light 4 adjacent to a ball pad 3 illuminates, the user kicks the associated pad 3 as quickly as possible to extinguish the light 4 and cause a signal to be sent to the control module 50 so that a successful hit is recorded and another light is activated. If the player is too slow, the light is extinguished without any hit being

recorded. The lights 4 may be illuminated either in a random pattern or in accordance with a pre-set sequence. A player may also optionally select a "ball-bias" so that the lights 4 towards one side are activated more frequently than those on the other side so that a use may attempt to improve his weaker foot.

5

The triggering of the sensor when a ball pad 3 is kicked will now be explained.

When a ball pad 3 is kicked by a user, the rocker arm 22 to which it is attached pivots in the direction indicated by arrow A in Figure 4 about the pivot axis 27.

This causes the actuator 35 to move downwardly in an arcuate path indicated by
10 arrow B in Figure 4. The actuator 35 interrupts or breaks a light beam generated by the optical sensor 36 thereby registering the kick by sending a signal to a main control unit 50 which identifies which ball pad 3 the signal was sent from. The sensor 36 can also be adapted to record additional information such as timing and velocity. As the rocker arm 22 pivots, the resilient damping block 31 is compressed.
15 After the actuator 35 has broken the light beam, the damping block 31 biases the rocker arm 22 back to its original rest position. Excessive movement of the rocker arm 22 is prevented by the rebound restraint rod 32 and its associated ant-knock rubber 34 that dampens vibration of the rocker arm 23.

20 It will be appreciated that by tightening the nut 33 on the restraint rod 32, the freedom of movement of the rocker arm 23 may be adjusted. The exact position of the rocker pivot axis 27 could also be adjustable to accommodate different objectives, feel and responses when the ball pad 3 is kicked.

25 It will be appreciated that an optical sensor 36 is not essential and could be replaced with another type of sensor device. For example, a Hall type sensor element could be used.

The control module 50 may additionally house a sound generator capable of
30 generating an audible tone whenever a ball pad 3 has been successfully struck by the player.

As will be appreciated from the detailed description of the preferred embodiments, the present invention provides a versatile training device for soccer players who wish to improve their timing and reflexes.

5 As explained above, the apparatus is controlled by one or more computer programs which in the preferred embodiment include at least one program that enables the user to monitor his or her performance at different levels of difficulty, thereby giving the user a fixed scale against which they can compete through repeated use of the training device. For example, it may be possible to vary the number of ball pads
10 3 which must be struck in a given length of time, the higher the skill level selected, the more ball pads 3 that must be kicked successfully to obtain a high score. For example, an amateur would select an easy skill level in which 60 pads must be kicked in one minute whereas an experienced player may select a higher skill level in which, for example, 120 pads must be kicked in one minute. A second program
15 may enable the user to assess the speed of his or her reactions.

It is envisaged that there are many modifications and variations of the device that have not been described but will still fall within the scope of the appended claims.

Claims

1. According to the present invention, there is provided a soccer training apparatus including a chassis and a plurality of contact members on the chassis
5 arranged, in an operable configuration, to at least partially surround a user, each contact member having a visual indicator associated therewith capable of being activated by a user in accordance with a random or preset sequence, switch means associated with each contact member operable to deactivate said associated visual indicator when a contact member is kicked by the user and control means for
10 detecting when a visual indicator has been deactivated and for activating the next visual indicator in the sequence, wherein each contact member is attached to a rocker arm pivotally mounted to the chassis and the switch means comprises an actuator on the rocker arm and a sensor on the housing such that, when a contact member is kicked by a user, movement of the actuator is detected by the sensor to
15 deactivate the visual indicator.

2. Apparatus according to claim 1, wherein the sensor comprises an optical sensor and the actuator is a blocking element, the arrangement being such that the blocking element moves to interrupt a beam of light generated by the
20 sensor in response to a ball pad being kicked, said interruption being detected by the sensor.

3. Apparatus according to claim 2, wherein the rocker arm includes biasing means to bias it into a rest position in which the blocking element does not
25 interrupt the light beam.

4. Apparatus according to a claim 3, wherein the biasing means is a resiliently compressible member disposed between the rocker arm and the chassis.

30 5. Apparatus according to any preceding claim, including a stop to limit rebound of the rocker arm after a ball pad has been kicked.

6. Apparatus according to claim 5, wherein said stop is a rod upstanding from the chassis through an aperture in the rocker arm and rocker arm restraint means mounted on the rod.

5 7. Apparatus according to claim 6, wherein the rod is threaded and the rocker arm restraint means comprises a nut threadingly received on a portion of the rod that protrudes through the aperture in the rocker arm.

8. Apparatus according to claim 7, wherein the rocker arm is normally biased
10 against the nut by the compressible member.

9. Apparatus according to claim 7 or claim 8, wherein a damping member is disposed between the nut and the rocker arm.

15 10. Apparatus according to any preceding claim, wherein the contact member has a foamed polyurethane core.

11. Apparatus according to any preceding claim comprising a plurality of releasably attachable modules, each module including at least one contact member.

20 12. Apparatus according to claim 10, wherein co-operating means is provided at each end of a module for attachment to an adjacent module.

13. Apparatus according to claim 10, wherein the co-operating means comprises
25 a tenon on one module that dovetails with a mortise on an adjacent module.

14. Apparatus according to claim 12, wherein the co-operating means incorporates an electrical connector.

30 15. Apparatus according to claims 10 to 14, wherein the control means is a control unit releasably attachable to the free end of one module.

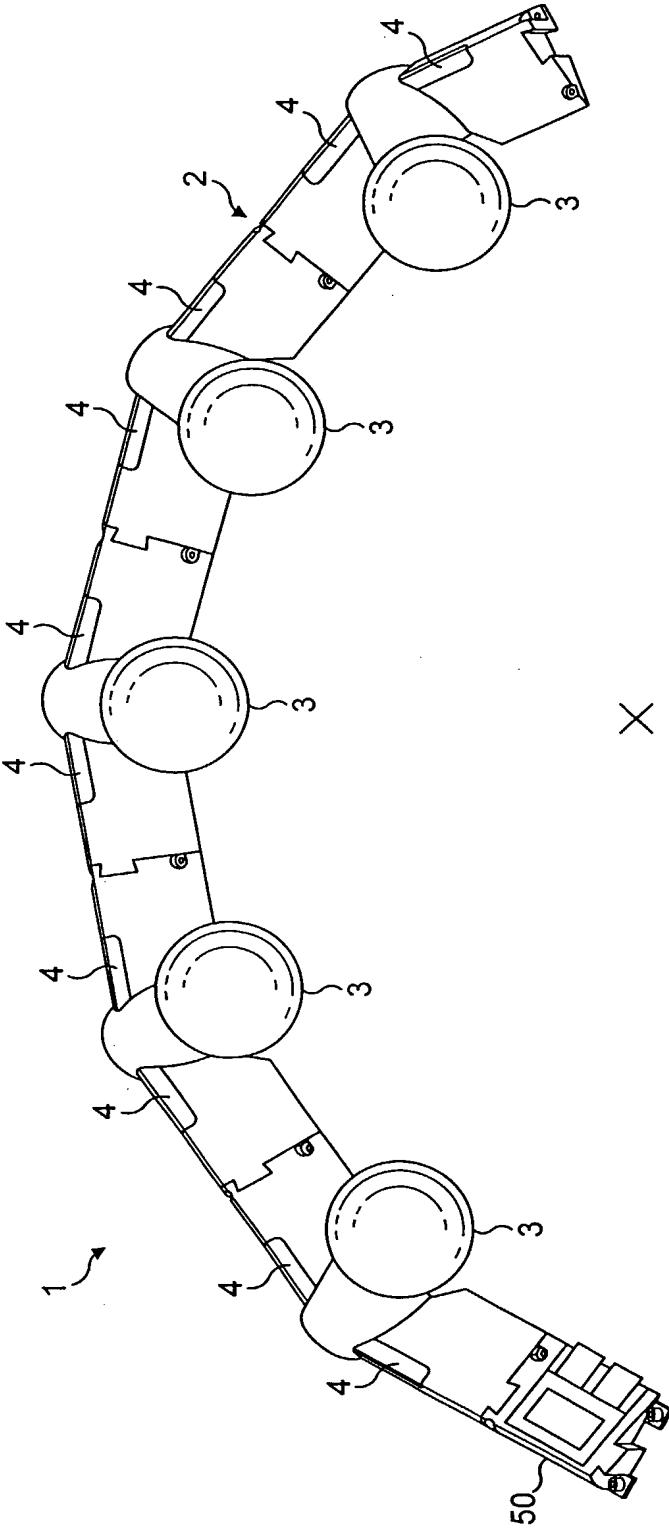
16. Apparatus according to claim 8, wherein the modules co-operate together to partially surround a user in an arcuate configuration.

17. Apparatus according to any preceding claim, wherein the control unit
5 comprises a computer processor, a memory for storing one or more computer programs and a use interface for selecting a program stored in the memory.

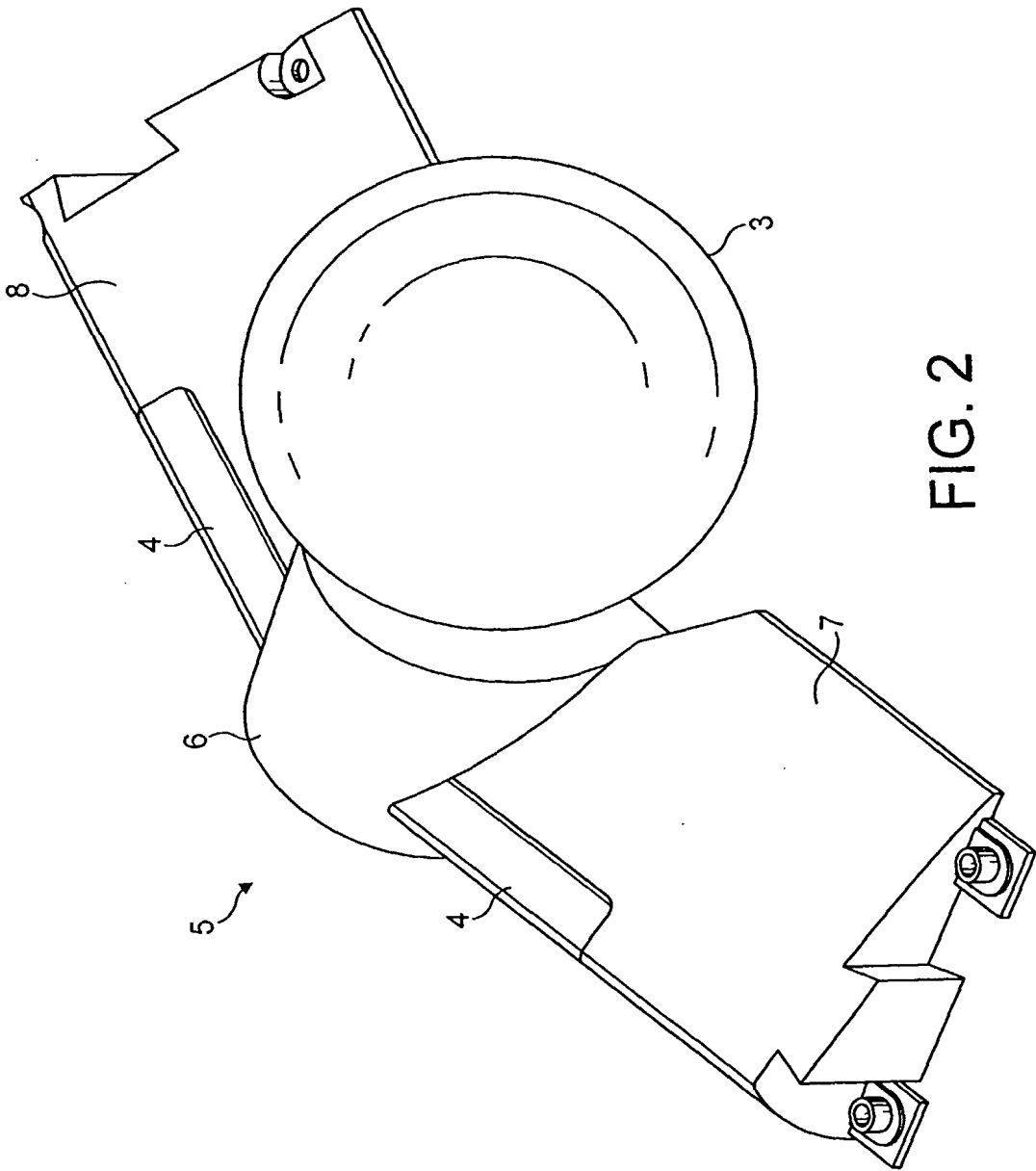
18. A computer program for use with a soccer training apparatus comprising a chassis and a plurality of contact members on the chassis each having a visual
10 indicator, the program being operable, when run on a computer processor, to activate the visual indicators in a random or preset sequence, switch means associated with each contact member being operable to deactivate an associated visual indicator when a contact member is kicked by a user, the program also being operable to activate the next visual indicator in the sequence.

15

19. Apparatus substantially as hereinbefore described with reference to the accompanying drawings.



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FIG. 1



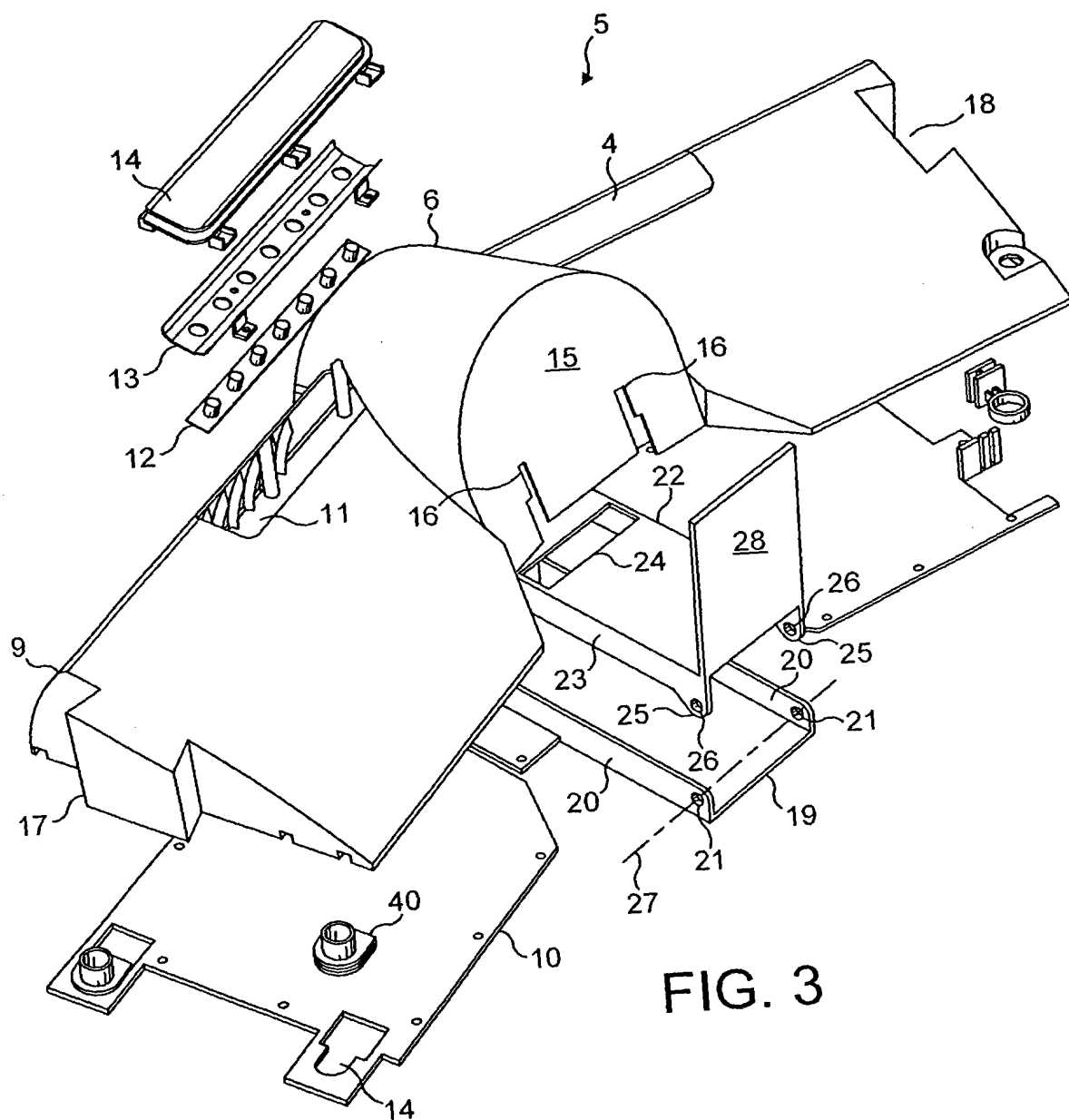
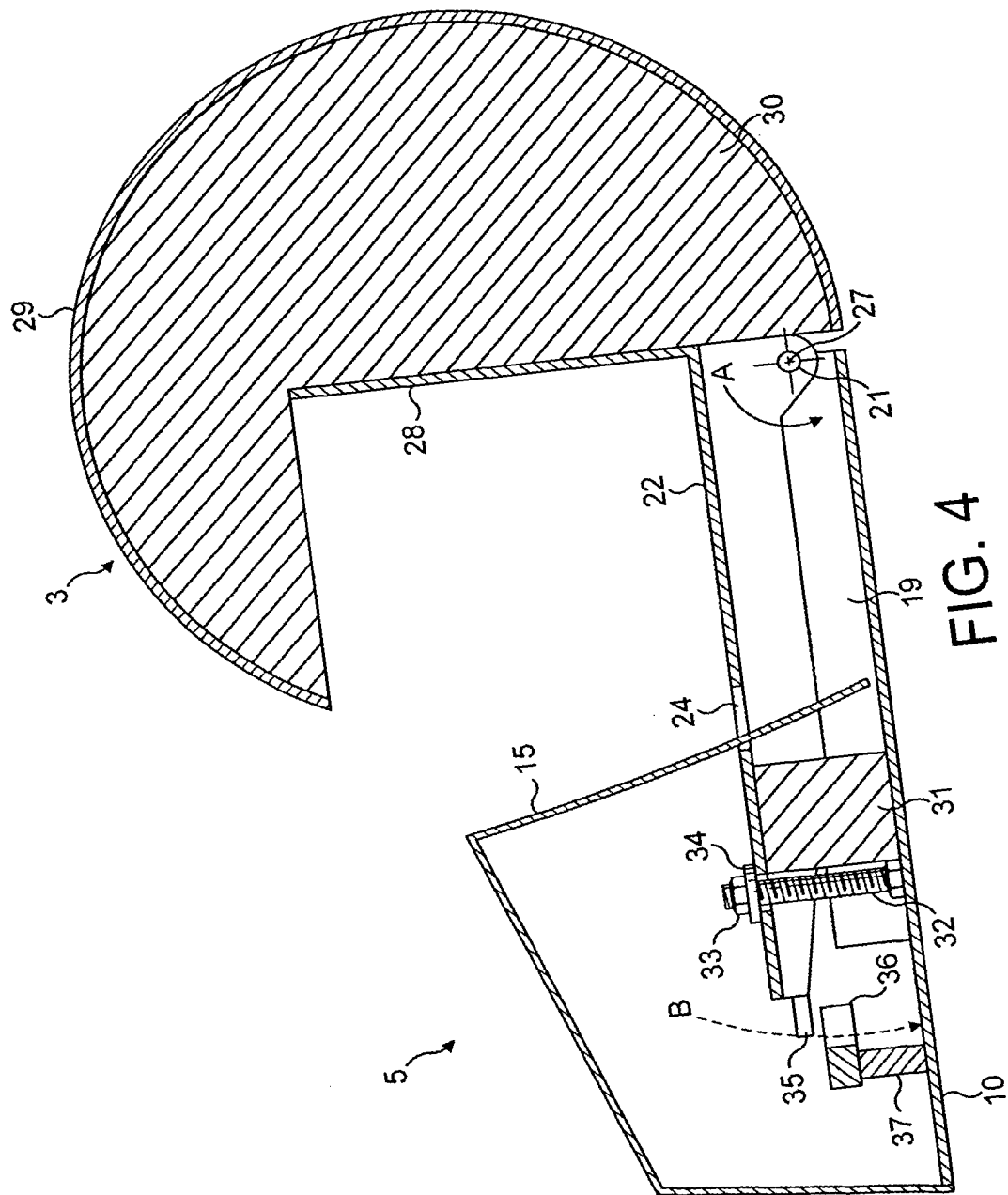


FIG. 3



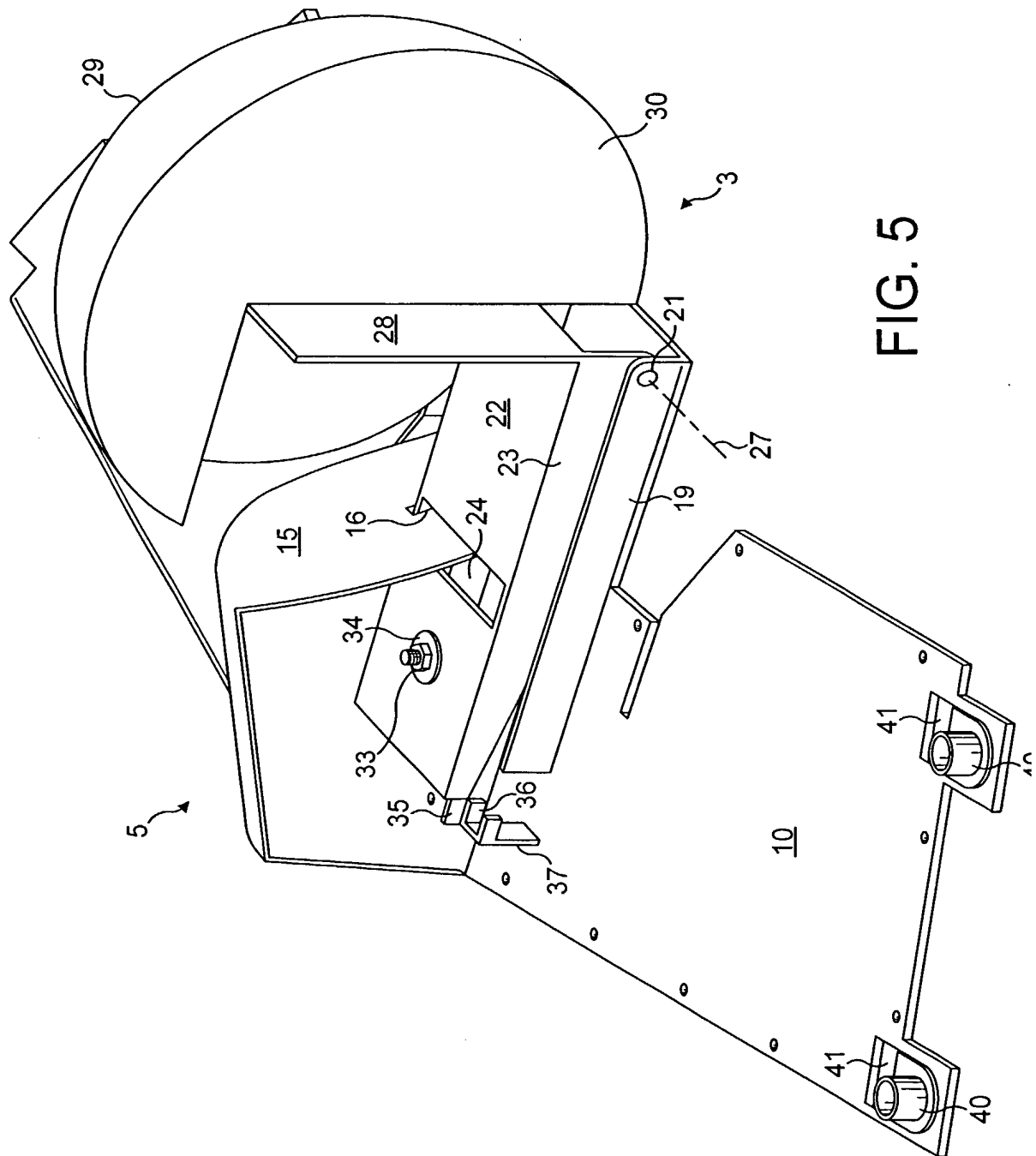


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB 02/04611

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63B69/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | WO 99 33531 A (BIRCHILL LIMITED; YOUNG GEORGE REDBURN) 8 July 1999 (1999-07-08) the whole document | 1,11-17 |
| A | US 4 627 620 A (YANG JOHN P) 9 December 1986 (1986-12-09) column 3, line 7 -column 4, line 12; figures 3-5 | 1 |
| A | CH 680 705 A (URS STOLLER) 30 October 1992 (1992-10-30) column 2, line 63 -column 3, line 33; figure 2 | 1 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

28 January 2003

Date of mailing of the international search report

04/02/2003

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 02/04611

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 18, 19
because they relate to subject matter not required to be searched by this Authority, namely:
Claim 18: Rule 39.1(vi) PCT - Program for computers
Claim 19: Rule 6.2(a)
PCT - Reference to the description and to the drawings
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB 02/04611

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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